BRITISH COLUMBIA
MINISTRY OF FORESTS

Tree Farm Licence 42

Issued to Tanizul Timber Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective August 1, 2001

Ken Baker
Deputy Chief Forester

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Objective of this Document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 42. This document also identifies where new or better information is needed for incorporation into future determinations.

Description of the TFL

TFL 42, held by Tanizul Timber Ltd. (the licensee), is situated in the centre of British Columbia approximately 50 kilometres northwest of Fort St. James and about 170 kilometres northwest of Prince George. The Tl'azt'en Nation owns and controls Tanizul Timber Ltd. and administers the company's activities through an elected board of directors. The directors seek the authority of the Tl' azt'en on all economic, operational, cultural, and social issues that are foreseeable, or that result from management of the TFL.

The TFL is bordered by Stuart Lake, Trembleur Lake and the Tachie River, and is situated in the Fort St. James Forest District, which is part of the Prince George Forest Region. The TFL is administered from the British Columbia Forest Service (BCFS) Fort St. James Forest District office in Fort St. James. The topography of the licence area consists mainly of rolling to broken terrain ranging in elevation from 750 to 1450 metres above sea level. The TFL includes numerous smaller lakes including Tarnezell and McKelvey Lakes.

The total area of the TFL is 49 111 hectares, and includes a productive forest land base of about 44 993 hectares or 92 percent of the total area. Forests in the area are predominantly mixtures of lodgepole pine, white spruce, Douglas-fir, and sub-alpine fir. The Engelmann Spruce Subalpine-Fir and the Sub-Boreal Spruce biogeoclimatic zones extend across the licence area. The climate of the area is characterized by cold winters and generally warm summers with an annual precipitation of approximately 50 centimetres.

History of the AAC

TFL 42 was issued in 1983 to Tanizul Timber Ltd. with an AAC set at 120 000 cubic metres. In 1988, with the approval of Management Plan (MP) No. 2, the AAC was temporarily raised to 132 300 cubic metres, an increase of about 10 percent, to facilitate the short-term management of a mountain pine beetle epidemic on the TFL. The temporary increase was granted with the provision that unless there were compelling reasons to maintain the AAC at this elevated level, MP No. 3 would recommend the AAC return to a lower level.

Effective July 1, 1996, the chief forester determined a new AAC for TFL 42 of 120 000 cubic metres, a reduction of 12 300 cubic metres or about nine percent from the previous AAC.

New AAC determination

Effective August 1, 2001 the new AAC for TFL 42 will be 160 000 cubic metres, an increase of 40 000 cubic metres or about 33 percent from the current AAC. I consider this AAC to be an extraordinary measure to manage an epidemic bark beetle infestation on the TFL. This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

The following observation is important to and forms an integral part of this determination. The licensee and BCFS district staff will monitor the current bark beetle infestation and apprise the deputy chief forester of the status of the infestation, on the understanding that, if and when it appears that losses to the infestation have abated, this determination may be revisited at a date earlier than required by statute.

Information sources used in the AAC determination

- *Timber Supply Analysis Information Package: TFL 42*, MP No. 4, Tanizul Timber Ltd., dated April 2001, accepted May 29, 2001;
- Existing stand yield tables for TFL 42, approved by BCFS Resources Inventory Branch, May 10, 2001;
- Managed stand yield tables for TFL 42, approved by BCFS Research Branch, November 16, 2001;
- *TFL 42 Inventory Audit Results Overview*, BCFS Resources Inventory Branch, dated March 1996;
- *Timber Supply Analysis Report: TFL 42*, MP No. 4, Tanizul Timber Ltd., dated June 2001, accepted July 10, 2001;
- *Management Plan No. 4: TFL 42*, Tanizul Timber Ltd., dated June 2001, approved July 12 2001;
- *TFL 42, Twenty-Year Plan*, Tanizul Timber Ltd., dated June 2001, accepted July 9 2001;
- *Higher Level Plans: Policy and Procedures*, BCFS and Ministry of Environment, Lands and Parks (MELP), December 1996;
- Technical review and evaluation of current operating conditions on TFL 42 through comprehensive discussions with BCFS and MELP staff, including at the AAC determination meeting held in Victoria on May 24, 2001;
- Technical information provided through correspondence and communication among staff from BCFS and MELP;
- *Prince George Timber Supply Area Timber Supply Review Data Package*, dated December 1998;
- *Lakeshore Classification Guide: Fort St. James Forest District*, dated August 11, 2000;

- *Forest Health Management in the Fort St. James Forest District: District Manager Guidance*, dated January 11, 2001;
- *Fort St. James District Bark Beetle Strategic Plan*, Fort St. James District Stewardship Committee, Bark Beetle Subcommittee, dated January 21, 2000;
- *District Manager Guidance on Forest Health Management in the Fort St. James Forest District: Guidance for Operational Plans*, dated January 10, 2001;
- *TFL 42 Rationale for AAC Determination*, dated June 28, 1996;
- *Bark Beetle Management Guidebook*, BCFS and MELP, October 1995;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- Letter from the Minister of Forests to the Chief Forester, dated July 28, 1994, stating the Crown's economic and social objectives;
- Memorandum from the Minister of Forests to the Chief Forester, dated February 26, 1996, stating the Crown's economic and social objectives with regard to visual resources;
- *Forest Practices Code of British Columbia Act*, consolidated to March 2001;
- *Forest Practices Code of British Columbia Act Regulations and Amendments*, current as of March 2001;
- *Forest Practices Code of British Columbia Guidebooks*, BCFS and MELP;

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological, and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural, and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does; however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for TFL 42, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 is reproduced in full as Appendix 1.

In accordance with Section 23(3) of the *Interpretation Act*, the deputy chief forester is expressly authorized to carry out the functions of the chief forester, which include those required under Section 8 of the *Forest Act*.

The chief forester has expressed the importance of consistency of judgment in making AAC determinations. I also recognize the need for consistency of approach. I have observed the chief forester during a number of previous AAC determinations and am familiar with the guiding principles that the chief forester has employed in making AAC determinations. I find these principles to be reasonable and appropriate and I have adopted them as described below in making my AAC determination for TFL 42.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. When a large number of determinations are made for many forest management units over extended periods of time, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainty. To make his approach in these matters explicit, the chief forester has compiled a set of guiding principles for AAC determinations. I have reviewed these principles and find them to be reasonable, and thus I have adopted and applied them as deputy chief forester in AAC determinations for TFLs. These principles are set out below. If in some specific circumstance it may be necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge, a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation of current practices. It is not appropriate to base my decision on unsupported speculation

with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although implementation of the Forest Practices Code has been underway since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination, the chief forester takes this uncertainty into account to the extent possible in the context of the best available information. In making my determination for TFL 42, as deputy chief forester, I have followed the same approach.

As British Columbia progresses toward completion of strategic land-use plans, the eventual timber supply impacts associated with the land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy (PAS) and the Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be the position of the chief forester that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions that have not yet been taken by government. I consider this approach to be reasonable and appropriate. Like the chief forester, I will therefore not take into account the possible impacts of existing or anticipated recommendations made by such planning processes, nor attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impact in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are no longer considered to be part of the timber harvesting land base or to contribute to the timber supply in AAC determinations.

Forest Renewal BC funds a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. As with all components of an AAC determination, like the chief forester, I require sound evidence before accounting for the effects of intensive silviculture on possible timber supply. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical, and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, the chief forester should immediately reduce some AACs in the interest of caution. However, any AAC determination made by the chief forester or myself must be the result of applying our individual judgment to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I have made allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the Supreme Court of Canada. The AAC that I have determined should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within TFL 42.

With respect to future treaty decisions, as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government.

Overall, in making this AAC determination, as the deputy chief forester, I am mindful of the chief forester's obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act*, and of the chief forester's responsibilities under the *Forest Practices Code of British Columbia Act*.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TFL, a timber supply analysis is carried out by the licensee using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model, a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen that attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TFL is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it. In some cases, an AAC is determined that coincides with the base case starting harvest level. In other cases, an AAC is determined which differs significantly from the initial level modelled.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which I consider its predictions of timber supply should be adjusted, if necessary, to more closely reflect the current situation.

These adjustments are made on the basis of informed judgment, using currently available information about forest management, which may have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, such as the enactment of the Forest Practices Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgment and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgments that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis

The timber supply analysis for TFL 42 was prepared by Sterling Wood Group Inc. on behalf of the licensee. Sterling Wood Group Inc. used its proprietary model TREEFARM (version 6.6) to conduct the analysis. Based on a review by BCFS staff, as well as my previous experience examining results from this model, I am satisfied that TREEFARM is capable of providing a reasonable projection of timber supply for TFL 42.

In the timber supply analysis, the licensee provided two harvest forecast options in which the same assumptions regarding land base inventory, management practices and timber growth and yield were applied, with the exception of the assumptions regarding site productivity estimates. In the 'Current Management Option', site index adjustments suggested by the Old Growth Site Index (OGSI) projects (discussed later under *site productivity estimates)* were applied to stands older than 140 years of age. In the other harvest forecast, entitled the 'MoF Option', these OGSI adjustments were not applied.

Having reviewed the information and the associated uncertainties regarding timber supply on TFL 42, and considering the lack of local site productivity data for the TFL as discussed under *site productivity estimates*, I have concluded that the 'MoF option' best reflects current management practices on TFL 42, and is consistent with current accepted procedures regarding the application of OGSI adjustments. I therefore accept that the 'MoF option' represents the most suitable basis from which to assess the timber supply implications of uncertainty in the various factors.

For TFL 42, the 'MOF option' (hereafter referred to as the 'base case') projected an initial harvest rate of 120 000 cubic metres per year—the same as the existing AAC. In the base case, the initial harvest level was maintained for two decades, followed by successive declines of 10 percent per decade over three decades. The harvest then declines a further six percent in decade six and seven percent in decade eight before rising to achieve a long-term harvest level of 84 740 cubic metres per year in decade 10.

In the timber supply analysis, various sensitivity analyses were conducted to assess the risk to timber supply resulting from uncertainty in data assumptions and estimates. These sensitivity analyses have assisted me in considering the factors leading to my determination.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

The total area of TFL 42 assumed in the analysis was 48 985 hectares of which 44 973 hectares or 92 percent was classified as productive forest.

Following completion of the timber supply analysis, BCFS staff identified a number of small errors in the licensee's derivation of the total land base. Correction of these errors resulted in a revised total land base of 49 111 hectares and a corresponding total productive area of 44 993 hectares. Although these errors were not corrected in the analysis, I note that the order of magnitude of the error (about 0.04 percent of the total productive area) does not affect the results of the harvest projections. I therefore accept the areas assumed in the timber supply analysis for this determination.

As part of the process used to define the timber harvesting land base (i.e., the land base estimated to be biologically and economically available for harvesting), a series of deductions was made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest for ecological or economic reasons. For TFL 42, the deductions result in a current timber harvesting land base of approximately 31 453 hectares, or 64 percent of the productive forest land.

My consideration of the deductions applied in the derivation of the timber harvesting land base is presented in the following sections of this rationale.

- non-productive and non-forested reductions

In the timber supply analysis, areas classified as non-forested (e.g., rock, lakes, rivers, swamps, urban areas) and areas classified as non-productive forest were excluded from the land base assumed to contribute to timber supply. The total area excluded was 4011 hectares. The licensee also identified an additional 918 hectares of non-commercial cover (brush) and appropriately excluded them from contributing to the timber harvesting land base.

I acknowledge that the licensee used standard classifications in the forest cover inventory and am satisfied that the deductions applied to account for non-productive, non-forest and non-commercial areas were based on the best available information and are suitable for use in this determination.

- physical operability

Terrain characteristics and access typically affect the area potentially available for harvesting operations. Because of the TFL's relatively moderate topography and modest elevation range, timber harvesting is largely unrestricted by physical operability constraints such as adverse terrain. Those portions of the TFL that are considered physically inaccessible for harvesting, or that are not expected to be feasible to harvest economically, are categorized as inoperable and are excluded when deriving the timber harvesting land base.

There is no detailed operability mapping of TFL 42. Therefore, for the analysis the licensee approximated inoperable areas using a combination of stand age, slope class, site index, and stand volume criteria. Using these criteria and a geographic information system (GIS), the licensee estimated that 3829 hectares are currently considered unavailable for harvesting due to physical and economic operability constraints.

BCFS district staff reviewed the criteria and the resulting GIS-generated operability map for TFL 42 and have brought two concerns to my attention.

Firstly, they indicate that significant areas identified as inoperable will in fact be available for timber harvesting at some time in the future. The most significant area that was inadvertently classified as inoperable is an area of approximately 1650 hectares known as the Tan fire. This area is composed primarily of naturally-regenerated lodgepole pine stands that became established following a 1953 forest fire. The stands are now approximately 45 years old and were excluded from the timber supply analysis because the site index assigned in the forest cover inventory was less than the minimum site index specified by the licensee's operability criteria. However, a recent review of silviculture prescriptions confirms that the site index of these stands ranges from 13 to 22 metres—well above the minimum criteria for operability. As a result, it is likely that the majority of the Tan fire area, about 1300 hectares, should have been included in the timber harvesting land base.

A sensitivity analysis in which the timber supply implications of including this area were evaluated indicated that mid- and long-term timber supply may be under-estimated by as much as five and three percent respectively compared to the base case projection.

Secondly, in estimating the operable area of TFL 42, the licensee also applied minimum volume criteria in conjunction with slope criteria. For mature stands on slopes up to 30 percent, the licensee assumed that all stands greater than 140 cubic metres per hectare were operable. On slopes between 30 and 80 percent, only stands greater than 250 cubic metres per hectare were considered operable. BCFS district staff suggest that these criteria may be somewhat more restrictive than reflected in current practice on steeper slopes while less restrictive on slopes between 0 and 30 percent.

I have reviewed the methodology and assumptions used to derive the operable land base for TFL 42. Based on recent silviculture prescriptions and field verification by Fort St. James forest district staff, I find it likely that the majority of the Tan fire area will contribute to timber supply. Taking guidance from the licensee's sensitivity analysis, I have concluded that the mid- and long-term timber supply depicted in the base case may

be underestimated by five and three percent respectively on account of this factor, and have further discussed this in my 'Reasons for decision'.

For the areas excluded based on the licensee's minimum volume criteria the impact is less clear. I note that in 1996, the licensee committed to define inoperable areas in terms of physical inoperability, problem forest types, and slope/volume considerations during the term of MP No. 3. To date, this work has not been initiated. Given the continued uncertainty in the operability mapping, I request that the licensee thoroughly review and field-verify its operability criteria in time for the next determination. In the meantime, as I have no better information, I accept the volume by slope class criteria as modelled.

- roads, trails, and landings

In the analysis, the licensee excluded a percentage of the productive forest considered available for harvesting to account for the construction of roads, trails, and landings. Separate estimates were made for existing roads, trails, and landings, and for future roads, trails, and landings, to reflect both current access and anticipated road network requirements over time.

1) existing roads, trails, and landings

To account for existing roads, trails, and landings, Tanizul applied assumptions used in the *Prince George TSA Timber Supply Review Data Package* (December 1998). Using these assumptions, the licensee deducted 5.6 percent of areas classified as previously harvested to derive a total deduction of 523 hectares. In the Prince George TSA timber supply review, an additional 0.3 percent was deducted to account for productivity losses between blocks; however, this deduction was not applied in the TFL 42 analysis.

BCFS district staff reviewed the deductions applied in the analysis to account for existing roads, trails and landings, and compared them with local information they compiled from orthophotos. Based on this comparison, they indicate that the deductions assumed in the base case adequately represent current conditions on the TFL.

I have reviewed the estimates of existing roads, trails, and landings and discussed them with district staff. I note that the deductions assumed in the analysis are comparable to the estimates derived by district staff. Although the licensee did not specifically account for productivity losses between blocks as was done in the Prince George TSA, given the small percentage (0.3 percent) involved with this component, I am prepared to accept the information as modelled.

However, I note that data specific to TFL 42 would provide a more precise accounting for these structures, and recommend that the licensee collect local data and refine its methodology prior to the next AAC determination.

2) future roads, trails, and landings

To estimate the area of future roads, trails, and landings, the licensee again applied assumptions used in the *Prince George TSA Timber Supply Review Data Package*. In the analysis, the licensee applied the deduction by reducing the size of each stand by

5.2 percent as stands were harvested in the timber supply model. The total area excluded from contributing to the timber harvesting land base over the analysis horizon was 1162 hectares.

While the assumptions are not based on any local information specific to the TFL, BCFS district staff suggest the total deduction appears reasonable.

Having reviewed the methodology and deductions applied in the analysis, I conclude that the reductions to account for future access requirements are based on the best available information. I therefore find them acceptable for use in this determination. However, I encourage the licensee to develop estimates more specific to TFL 42 before the next AAC determination.

- soil stability

The licensee used 1996 terrain stability mapping to estimate the area unavailable for harvesting because of unstable soils. Unstable areas are classified as having either a moderate likelihood of landslide initiation following harvesting or road construction (terrain class IV) or a very high likelihood of landslide initiation following harvesting or road construction (terrain class V). In the analysis, the licensee assumed that on average 10 and 50 percent of areas classified as terrain classes IV and V respectively would not contribute to timber harvesting. However, the licensee did not provide any data to substantiate the assumed reductions. A total of 566 hectares of unstable areas were excluded from the timber harvesting land base after previous deductions.

BCFS specialists have reviewed the information and accept the terrain stability mapping. However, they indicate that based on past harvesting performance, the proportion of area deducted to account for terrain class V is likely too low. Staff suggest that a 100 percent deduction of terrain class V areas—representing an additional 40 hectares—would be more appropriate than the 50 percent assumed in the analysis. Nevertheless, because of the small additional area involved, I make no adjustments to the base case on account of this factor. I also note that at the operational planning level, harvesting approval is guided by site specific assessment of terrain stability.

- deciduous forest types

The licensee's inventory identifies approximately 5567 hectares of deciduous-leading stands. Since Tanizul considers only coniferous species to be merchantable on TFL 42, all predominantly deciduous stands were excluded from the timber harvesting land base. BCFS district staff confirm that Tanizul does not currently utilize deciduous species

Deciduous trees also occur as a minor component in stands that are predominantly coniferous. As discussed later under *volume estimates for existing stands*, the licensee accounted for deciduous volumes in coniferous-leading stands by applying reduction factors in the analysis to those analysis unit yield tables containing a component of deciduous volume.

Having reviewed the information, I find that the procedures used to account for deciduous species in the base case are consistent with current practice and are therefore appropriate

for use in this determination. However, I note that deciduous-leading stands account for a substantial proportion—over 12 percent—of the total productive forest on TFL 42. While the analysis assumptions are consistent with current practice, based on my experience in other areas of the province, I find it likely that the merchantability of deciduous species will improve in the future. Therefore, while I make no adjustments to the base case, I consider that long-term timber supply may be more favourable than projected in the analysis. If and when there is evidence that supports the merchantability of deciduous species, the implications to timber supply can be considered in future determinations.

- non-merchantable stands and low productivity stands

In the timber supply analysis, several classes of stands were excluded from the timber harvesting land base to account for low productivity and non-merchantable stands that are not typically harvested.

The licensee used a combination of inventory information on leading species, stand age, height class, stocking class, and site index criteria to define non-merchantable stands for the purposes of the analysis. The assumptions included site index criteria from the *Prince George Timber Supply Area Timber Supply Review Data Package* to define low productivity sites. In total, 203 hectares were excluded from the timber harvesting land base to account for non-merchantable and low productivity stands.

Having examined the criteria used in the base case and discussed them with district staff, I accept the information as the best available. I therefore conclude that the licensee adequately accounted for non-merchantable and low productivity stands and make no adjustments to the base case.

Existing forest inventory

The inventory data used for the timber supply analysis were derived from surveys completed during 1989 and 1991. For the analysis, the inventory file was updated to January 2000 to account for growth, disturbances such as harvesting and fire, and for silvicultural treatments.

BCFS Resources Inventory Branch completed an inventory audit of TFL 42 in 1995. The objective of the audit was to assess the overall reliability of the forest cover inventory. The audit found no statistical differences between the audit estimates and inventory volume estimates of mature stands.

Having reviewed the information, I note that the forest cover inventory used in the base case is the best available and I therefore accept it for this determination.

- age-class distribution and species profile

The age class structure of TFL 42 is largely a reflection of recent harvesting history as well as natural disturbances. Approximately 2 percent of stands are older than 200 years and 34 percent of stands on the timber harvesting land base are between 140 and 200 years old. About 39 percent of stands are between 100 and 140 years old, 10 percent are between 20 and 100 years old and approximately 15 percent are younger than 20 years.

The majority of TFL 42 is covered by spruce- and pine-leading stands, representing approximately 38 and 36 percent of the timber harvesting land base respectively. Douglas-fir and balsam-dominated stands comprise a further 14 and 10 percent of stands respectively. The balance of the timber harvesting land base (about 2 percent) is composed of mixed coniferous/deciduous forest.

Spruce-, lodgepole pine- and Douglas-fir-leading stands comprise the majority of the oldest stands, whereas the majority of immature stands are pine- and spruce-leading.

I have reviewed the age class distribution and species profile information for TFL 42 and note the relatively high proportion of juvenile stands on the TFL. I acknowledge that the lack of stands from 20 to 100 years old will affect timber availability in the mid term. I also note the significant area of older spruce- and pine-leading stands that are typically susceptible to bark beetle infestation.

- volume estimates for existing stands

In the timber supply analysis, existing natural stand volumes were estimated and projected using forest inventory attributes and the Variable Density Yield Prediction (VDYP) model (version 6.4a), developed by the BCFS Resources Inventory Branch. The volumes for existing natural stands in which species and stocking have not been managed—defined in this analysis as those stands 20 years of age and older—were projected using this model. Once a stand was harvested for the first time in the modelling, its future growth and yield were projected using estimates from the managed stand yield tables.

As described above under 'deciduous species', I note that the deciduous component of coniferous-leading stands was excluded from the yield projections of existing stands. I also note that this volume is not recovered during the licensee's harvesting operations.

As mentioned under 'Existing forest inventory', the BCFS completed an inventory audit in 1995 to determine the overall reliability of the TFL 42 forest inventory. The audit found no statistically significant differences between the volumes measured in the audit and those of the current inventory.

Volumes estimates were reviewed and accepted for use in the analysis by staff of the BCFS Resources Inventory Branch. Having reviewed the information and assumptions used in the analysis as well as the results of the inventory audit, I acknowledge that the licensee followed recognized procedures and therefore accept the estimates used for this determination.

Expected rate of growth

- aggregation procedures

In the timber supply analysis, the inventory for TFL 42 was aggregated into 26 analysis units based on leading species, site productivity class, and age class. Analysis units were divided into two age classes (stands over 140 years and stands less than or equal to

140 years) to facilitate the application of old-growth site index adjustments as described below under *site productivity estimates*.

I have reviewed the approach used by the licensee and consider the analysis unit definitions and aggregation procedures to adequately reflect the productivity of this unit.

- site productivity estimates

Inventory data include estimates of site productivity for each forest stand, expressed in terms of a site index. The site index is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

In general in British Columbia, site indices determined from younger stands (i.e., less than 31 years old), and older stands (i.e., over 140 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the old-growth site index (OGSI) project—suggest that actual site indices may be higher than those indicated by existing provincial inventory data from old growth forests. Studies include those known as 'paired-plot'—where plot samples from an old-growth stand and the adjacent second growth stand are compared—and a provincial veteran tree study. It has been consistently concluded from such studies that site productivity has generally been underestimated; managed forest stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

For the TFL 42 base case, site index was assigned to stands younger than 30 years based on site index values identified in the forest cover inventory. For stands aged 30 years or older, the licensee used the VDYP model to generate site index.

Standard BCFS conversion equations were used to calculate the site index of regenerated stands where species conversions through planting were assumed in the model.
No OGSI adjustments were applied in the base case. However, the licensee provided a sensitivity analysis to show the impact on timber supply of applying general provincial OGSI adjustments to all stands older than 140 years when they were harvested and regenerated in the model. Applying OGSI adjustments increased long-term timber supply by 17 percent compared to the base case forecast, while mid-term timber supply increased only slightly.

Having reviewed the information, including the findings of OGSI studies, and given the trends in old growth site index observed elsewhere in the province, I accept that there is a high likelihood that future stand yields on TFL 42 may be significantly underestimated in the base case. I have considered the implications of this uncertainty in my 'Reasons for decision'.

- volume estimates for managed stands

The Table Interpolation Program for Stand Yields (TIPSY) model, developed by the BCFS Research Branch was used to estimate volumes for managed stands. Managed stands for TFL 42 were defined as all existing stands less than 20 years old, and all stands regenerated in the future.

The managed stand yield tables were reviewed and accepted by BCFS Research Branch staff for use in the analysis. However, in their acceptance Research Branch staff noted that the licensee incorrectly substituted balsam—balsam yield tables are not yet available in TIPSY—with hemlock where spruce should have been used as the TIPSY species input. A subsequent analysis by BCFS staff indicates that this incorrect substitution results in an overestimation of the total projected volume of regenerating stands of less than one percent.

Tanizul also provided a sensitivity analysis to show the impact on timber supply of increasing and decreasing regenerated stand yields by ten percent. The analysis showed that mid-and long-term timber supply are sensitive to changes in regenerated stand yields. Overestimating regenerating stand yields in particular causes a significant disruption in mid-term timber supply during decades seven through nine. However, other than the incorrect species substitution above, I have no evidence that suggests that the volume estimates for managed stands are overestimated.

Having discussed the information with BCFS staff, and noting the incorrect species substitution identified by Research Branch, I accept the assumptions regarding volume estimates for managed stands for use in this determination.

- operational adjustment factors

TIPSY projections are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases, and significant brush competition in the stand. Certain operational conditions, such as less than ideal tree distribution, small non-productive areas, endemic pests and diseases, or age dependent factors such as decay, waste, and breakage cause actual yields to be less than the theoretical TIPSY yields over time. Operational adjustment factors (OAFs) are applied to yields generated using TIPSY to account for losses of timber volume resulting from these operational conditions. OAF 1 accounts for factors affecting the yield curve across all ages, including small stand openings, uneven tree distribution, endemic pests, and other factors. OAF 2 accounts for decay, waste, and breakage.

In the analysis, the licensee applied the standard provincial volume reduction of 15 percent for OAF1 except to stands within an area known as the Pierre forest where a 20 percent OAF1 was assumed. Both the licensee and BCFS district staff indicate that current and future stands within the Pierre forest experience brush competition upon regeneration, resulting in less uniform tree distribution. For OAF2, the licensee applied the standard provincial volume reduction of 5 percent to all regenerating stands in the TFL.

I have reviewed the information on operational adjustment factors, and accept that the standard provincial reductions account for the majority of operational conditions on TFL 42. For the Pierre forest I have considered it likely that because of the local site conditions, brush competition within the Pierre forest may result in a less uniform distribution of stems and a correspondingly higher OAF1. I note that the precise magnitude of actual losses due to the factors underlying OAF values is subject to considerable uncertainty and requires ongoing investigation and refinement. However, I note that any reductions in regenerating stand yields affect primarily mid- and long-term timber supply, and do not influence the short term.

Therefore, in the absence of better information, I accept the licensee's assumptions regarding OAFs. Any new information that becomes available can be incorporated into the next timber supply analysis for TFL 42.

- minimum merchantability standards

In timber supply analysis, estimates are made of the earliest age at which a forest stand has reached a harvestable condition or has met minimum merchantability criteria. The assumptions largely affect when second growth stands will be available for harvest in the model. In practice, many forest stands will be harvested at older ages than the age at which they reach minimum merchantability, due to economic considerations and constraints on harvesting which arise from managing for other forest values such as visual quality, wildlife and water quality.

In the timber supply analysis for TFL 42, all stands were required to meet both a minimum volume requirement of 250 cubic metres per hectare, and a minimum age requirement. The minimum age requirement varied between 80 and 120 years, depending on the leading species of the stand.

BCFS district staff have reviewed the assumptions and suggest that the minimum volume criteria assumed in the base case may be higher than the volume at which stands would be harvested operationally. To test the potential implications, the licensee reduced the minimum volume criteria from 250 cubic metres per hectare to 200 cubic metres per hectare in a sensitivity analysis. The results showed that reducing the volume criteria had no significant impact on the base case harvest projection.

I have reviewed the assumptions used to model minimum merchantability standards on TFL 42. I acknowledge that predicting the age or volume at which stands may be harvested in the future is difficult and subject to considerable uncertainty. Having considered the methodology applied in the analysis, and taking guidance from the licensee's sensitivity analysis, I accept the minimum merchantability criteria assumed in the base case as satisfactory for use in this determination. However, I note that the assumptions used may overestimate the actual merchantable age and I encourage the licensee to refine these criteria before the next analysis.

- harvest profile/harvest sequencing

The timber supply model TREEFARM can accommodate a preferred harvest profile during the simulation period. In the model harvest parameters are specified in a preferred

harvest profile matrix to direct the model to the stands that should be selected first for harvest.

The matrix was derived from recent harvest records provided by the Fort St. James forest district. The proportions described in the matrix were used to guide harvest for each analysis unit and age class in the modelling. Where the volume targets could not be met based on the proportions defined in the matrix, oldest stands were targeted for harvest—first within each analysis unit, and then from a list of all of the analysis units in order of preference.

I have reviewed the methodology and assumptions used in the timber supply analysis and have discussed them with BCFS timber supply branch and district staff. I find that the harvest sequencing rules applied in the analysis are broadly consistent with current operations and note that operationally the harvest profile is currently driven largely by the degree of beetle infestation and the associated salvage operations. I have concluded that the assumptions used in the base case reasonably approximate current practice and I therefore accept them for use in this determination.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forest to be re-established following harvest

- regeneration delay

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable well-spaced seedlings. In the timber supply analysis, Tanizul assumed a two-year regeneration delay for all species regenerated through planting except in the Pierre forest where a four-year regeneration delay was applied to reflect the site conditions and the potential for brush competition in the area.

Fort St. James district staff reviewed the regeneration delays on approximately 60 openings and determined that the analysis assumptions reasonably reflect operational practice. Having reviewed the assumptions used in the analysis and discussed them with district staff, I accept the estimates of regeneration delay as reasonably consistent with current practice. I therefore conclude that they are suitable for this determination.

- impediments to prompt regeneration

No specific impediments to prompt regeneration were identified for TFL 42. In Management Plan No. 4, the licensee indicates silviculture strategies include ensuring all cutblocks are planted within two to three growing seasons following harvest, and ensuring cutblocks with significant potential brush problems are planted within one growing season following harvest.

BCFS district staff confirm that for some sites on TFL 42, aggressive silvicultural management including site preparation, planting and brushing is required, and that this is managed appropriately by the licensee. As described under *operational adjustment factors*, I note that the licensee applied a 20 percent OAF1 to the yields of regenerating

stand in the Pierre forest area to simulate less uniform tree distribution resulting from brush competition.

Having reviewed the information regarding impediments to prompt regeneration and discussed it with BCFS staff, I am satisfied that there has been appropriate accounting for this factor in the analysis.

- not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are those areas where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established. Where a suitable stand has not been regenerated and the site was harvested prior to 1987, the classification is 'backlog' NSR. All other NSR is considered 'current' NSR.

Based on the licensee's resource inventories, the TFL 42 timber harvesting land base includes an estimated 2956 hectares of NSR areas. In the TREEFARM model, all NSR areas were assumed to regenerate in the first year of the forecast horizon. The areas were distributed to each analysis unit by forest type according to recent harvest patterns.

BCFS district staff have reviewed maps of the NSR areas and indicate that the NSR area assumed in the analysis is likely significantly overestimated. Tanizul staff agree with this assessment. They advise that, although not yet reflected in the resource inventories, recent silviculture surveys indicate that the majority of backlog NSR areas are well stocked. However, no data were provided to support this assertion.

I have reviewed the information and discussed it with district staff. Although no distinction between current and backlog NSR areas was provided in the analysis, I have considered that approximately 800 hectares of the 2956 hectares classified as NSR area is likely 'current' NSR, based on the annual area harvested and the assumed regeneration delay. While I find it likely that the area of backlog NSR within the TFL was overestimated in the analysis, I note that all NSR areas are reintroduced into the timber harvesting land base during the first year of the harvest projection and therefore contribute to timber supply in the model, regardless of their NSR classification. I also note that this uncertainty primarily affects mid- to long-term timber supply.

Having reviewed the assumptions regarding NSR areas and discussed them with BCFS staff, I am satisfied that currently no specific adjustment to the base case on account of this factor is warranted. However, I request that the licensee provide a comprehensive accounting of all NSR areas on TFL 42 and ensure that the management objectives for these areas are clarified in time for the next determination.

(iii) silvicultural treatments to be applied to the area,

Silvicultural treatments to be applied

- silvicultural systems

The predominant silvicultural systems currently employed on TFL 42 are clearcutting and clearcutting with reserves. According to the licensee, these systems account for over 95 percent of the total volume harvested annually.

In the timber supply analysis, even-aged management was assumed in the base case. BCFS district staff indicate they are not aware of any partial cutting systems on TFL 42 and confirm that the analysis assumptions regarding the use of clearcutting systems are consistent with current practice.

Having reviewed the information and discussed it with BCFS staff, I am satisfied that the assumptions used in the analysis appropriately reflect the systems currently employed on TFL 42. I therefore accept the assumptions as modelled for this determination. I also note that the licensee accounted for wildlife tree patches and retention within riparian management areas and will discuss this later under *stand-level biodiversity* and *riparian considerations* respectively.

- use of select seed

The Forest Practices Code requires the use of the best genetic quality (seed and vegetative material) source available for regeneration. Select seed produced from seed orchards is the product of B.C.'s forest gene resource management program, which uses traditional tree breeding techniques to select naturally-occurring, well-adapted, healthy and vigorous trees.

The timber supply analysis did not account for the use of select seed on TFL 42. However, a review of recent sowing request records by BCFS Timber Supply Branch staff indicates that the regeneration program on TFL 42 includes a significant proportion of select interior spruce seed. The average indicated genetic worth of the requested seed is approximately 7 percent, with genetic gains for spruce anticipated to be higher in the future.

Further examination of the regenerating stand yields for spruce-leading stands suggests that volume projections may be underestimated by up to 5 percent based on the current use of genetically improved seed on TFL 42. As a result of this underestimation, BCFS staff estimate that long-term timber supply may be up to 2 percent higher than the level projected in the base case.

Having reviewed the information regarding the use of select seed, and in view of the requirement under the Forest Practices Code that it be used where available, I am satisfied that the use of select seed in the regeneration program on TFL 42 will continue at least at the current level. For this determination, therefore, I will take into account the level of current use, which indicates that the long-term timber supply projected in the base case is

likely underestimated by up to 2 percent. I have further discussed my considerations of this factor below under 'Reasons for decision'.

- incremental silviculture

Incremental silviculture includes activities such as juvenile spacing, pruning, and fertilization that are beyond the silviculture activities required to establish a free-growing forest stand.

While the licensee suggests that opportunities for incremental silviculture will be explored, no activities are planned or identified in Management Plan No. 4, nor were any assumed in the timber supply analysis. BCFS district staff confirm that the analysis assumptions reflect current operational practice, as incremental silviculture is not currently employed on TFL 42.

I have reviewed the information and assumptions regarding incremental silviculture and am satisfied that current practice was appropriately reflected in the timber supply analysis. I therefore accept the information as the best available information and suitable for use in this determination.

- commercial thinning

Tanizul has not conducted commercial thinning operations on TFL 42 nor has the licensee identified any plans for future commercial thinning. Commercial thinning was therefore appropriately not modelled in the timber supply analysis.

Based on the current age class structure of stands on TFL 42, I note that opportunities for commercial thinning appear to be limited for the foreseeable future.

Having considered the information and discussed it with district staff, I acknowledge that the timber supply analysis reflects current operational practice and have therefore made no associated adjustments to the base case projection.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

Timber harvesting

- utilization standards

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. These standards were incorporated into the yield estimates for the timber supply analysis for TFL 42. To derive stand volume, a 30-centimetre maximum stump height and 10-centimetre minimum top diameter inside bark were assumed in the analysis. The licensee assumed a 12.5-centimetre minimum diameter at breast height (dbh) for trees in lodgepole pine-leading stands and a 17.5-centimetre minimum dbh for trees of all other species

BCFS district staff indicate that the criteria used in the timber supply analysis correspond to current practice in all respects except that operationally, utilization is based on

diameter at stump height (dsh) rather than dbh. Staff indicate that, consistent with the TFL 42 agreement, current practice on TFL 42 is a 15-centimetre minimum dsh for lodgepole pine and a 20-centimetre minimum dsh for all other species.

I have reviewed the utilization standards assumed in the analysis and discussed them with BCFS staff. I acknowledge that there are slight differences in how utilization was modelled in the analysis versus how it is measured operationally. However, I note that because of log taper, the dbh criteria used in the analysis closely approximate the dsh standards in use operationally. For timber supply purposes, I therefore accept the utilization assumptions as broadly consistent with operational practice and therefore reasonable for use in this determination

- decay, waste and breakage

To account for decay, waste, and breakage, the licensee generated natural stand yield tables using standard factors for forest inventory zone (FIZ) 'I' as well as data from Public Sustained Yield Unit (PSYU) #458. This approach was reviewed and accepted by BCFS Resources Inventory Branch specialists.

I have reviewed the information regarding the decay, waste, and breakage in existing stands on TFL 42, and am satisfied that the best available information was used. These factors were appropriately accounted for in the analysis, and I therefore accept them as suitable for this determination.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect, and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation, and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

Current management on TFL 42 includes specific provisions for many resource values, as discussed in the following sections.

- recreation resources

Recreation use on the TFL consists primarily of self-directed activities such as hunting, boating, angling, and snowmobiling. Stuart and Trembleur Lakes provide many of the area's recreational opportunities. A Recreation Features Inventory of TFL 42 was completed in 1995. There are currently no recreation sites within TFL 42 nor does the licensee have plans to develop any in the immediate future. The licensee therefore appropriately made no deductions to specifically account for recreation.

BCFS staff note that most recreation use within the TFL involves dispersed activities. Recreation values are typically addressed in resource development plans on a site-specific basis. They indicate that other than the visual quality considerations associated with viewscapes from major lakes (discussed below under *visual resource management*), there are currently no specific recreation concerns affecting timber supply on TFL 42. Having reviewed the information and discussed it with BCFS staff, I consider it the best available and am satisfied that the base case timber supply projection adequately reflects current management of the recreation resource.

- cultural heritage resources

TFL 42 is within the traditional territories of the Tl'azt'en Nation and the Yekooche First Nation. According to BCFS district staff the Tl'azt'en Nation have completed a traditional use study of their traditional territories, including the area of TFL 42. To date, I am unaware of any areas that are specifically identified as requiring protection for cultural or heritage resource values and no explicit accounting for cultural heritage resources was included in the analysis. District staff indicate that the analysis assumptions appropriately reflect current practice.

At this time, I have no information to suggest that heritage or archaeological values will impact the timber supply on TFL 42. Although no areas on TFL 42 have been identified as requiring protection for cultural or archaeological values, I acknowledge that additional assessments may be conducted in the future. If and when the results of these assessments indicate a need to exclude areas from the timber harvesting land base, the impact on timber supply can be considered in future determinations.

- visual resource management

Careful management of scenic values near recreation sites, highways, lakes, and other public use areas is an important IRM objective and is part of the BCFS mandate to manage the recreation resource. Procedures for factoring visual resources into timber supply analyses have been developed to address three management scenarios: known scenic areas with established visual quality objectives (VQOs); known scenic areas without VQOs (i.e., with Recommended Visual Quality Classes (VQCs) only); and inventoried visually sensitive areas (not yet 'known'). VQOs and VQCs are based on biophysical and social factors and specify the amount of visible disturbance acceptable for a given scenic area.

To meet these objectives in timber supply analyses, constraints must be placed on timber harvesting, road building and other forest practices in visually sensitive/scenic areas. The constraints are based on research, experience and on public preferences and acceptance of degrees of alteration of visual landscapes. The constraints are normally expressed in terms of forest cover requirements that relate to the maximum allowable percentage of a viewshed that can be harvested at any one time, and to 'visually effective green-up'—that is the stage at which regeneration has been shown to be visually acceptable to the public.

A visual landscape inventory of TFL 42 was completed in 1994. The Fort St. James district manager made scenic areas known in the Fort St. James district in January 1999—

including areas identified in the visual landscape inventory of the TFL. Important visual quality considerations on TFL 42 include managing the special viewscapes visible from Stuart and Trembleur Lakes, from the Tachie River, as well as from the many smaller lakes within the TFL.

In the base case, the licensee modelled these known areas by applying forest cover constraints to three recommended VQO zones comprising approximately 13 420 hectares of the productive forest. The modification, partial retention and retention VQO zones account for approximately 17, 10 and 1 percent of the timber harvesting land base respectively. Tanizul used standard BCFS procedures to determine the proportion of allowable disturbance and the minimum green-up ages for each recommended VQO. A sensitivity analysis conducted by the licensee indicates that the existing visual quality requirements can be met with virtually no impact to timber supply relative to the base case.

I have reviewed the base case assumptions and related sensitivity analysis and discussed the implications with BCFS staff. While I note that VQOs have not yet been formally established, the analysis assumptions were based on the best information available and reasonably reflect current practice for visual concerns. I therefore accept them for this determination.

I acknowledge Tanizul's commitment to update the visual landscape inventory for TFL 42 during the term of Management Plan No. 4 and request that the licensee also include a detailed inventory of Tarnezell and McKelvey Lakes as part of this update due to their higher uses for recreation purposes by the band and the public in general. I note that the more detailed information on the location and visual sensitivity of the viewshed from these two lakes is consistent with the LRMP intent (see *Fort St. James Land and Resource Management Plan*) that visually important areas with tourism, recreational or other significance be managed in a manner that recognizes those values. This information can be incorporated into the next analysis.

- riparian considerations

Riparian habitats occur along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones (RRZs) that exclude timber harvesting, and riparian management zones (RMZs) that restrict timber harvesting in order to protect riparian and aquatic habitats. For each stream, lake or wetland, the RRZ and RMZ make up the entire riparian management area. Stream riparian classes (S1 to S6) are described in the *Riparian Management Area Guidebook* and are determined based on the presence of fish, occurrence in a community watershed, and average channel width criteria. The stream class is used to estimate the area required to be retained in the RRZ and the area or volume to be retained in the RMZ. Similar criteria are used to classify lakes and wetlands.

In the timber supply analysis, stream lengths on two sample areas within the TFL were classified and digitized using GIS-based methods. The proportion of stream length in each stream class from the samples was then applied to the total stream length in the licensee's stream database. Using GIS techniques and stream buffer widths specified in

the *Riparian Management Area Guidebook* the licensee determined the associated area of RRZs and RMZs. However, during the derivation of the timber harvesting land base, the licensee inadvertently doubled the appropriate buffer widths along the Tachie River (an S1 stream) resulting in the exclusion of approximately 140 hectares more than was intended.

For lakes and wetlands, the licensee used forest inventory maps and procedures in the draft *Fort St. James District Lake Classification Plan* to determine the appropriate reserve and lakeshore management zone widths. Using a GIS, Tanizul then estimated the corresponding area of RRZs and RMZs adjacent to lakes and wetlands in the TFL. For streams, lakes, and wetlands on TFL 42, the total area associated with RRZs and RMZs was 857 hectares and 1192 hectares respectively.

In the timber supply analysis, the licensee appropriately assumed that 100 percent of RRZs would be reserved from harvesting and therefore excluded the area of RRZs (777 hectares after previous deductions) from the timber harvesting land base. For RMZs the licensee assumed that on average, 10 percent of stand volume would remain within the RMZs following harvesting. To reflect this assumption, Tanizul permanently excluded 10 percent (256 hectares after previous deductions) of the total area of RMZs from the timber harvesting land base

BCFS staff and MELP staff (now part of the new Ministry of Water, Land and Air Protection) have reviewed the deductions applied in the analysis and suggest that the proportion of S5 streams on the TFL is likely overestimated in the analysis. Staff also advise that S4 streams are likely under-represented.

I have examined, the above information and acknowledge that the licensee's methodology employed a limited sample of stream features on the TFL. I also note that according to the *Riparian Management Area Guidebook*, the recommended zone widths for S4 and S5 streams are equivalent. Therefore, any uncertainty between the relative proportion of S5 versus S4 streams probably has minimal implications for timber supply. I acknowledge the possibility that S3 streams may also be under-represented, but have no specific information to substantiate this possibility. Moreover, the resulting deductions for riparian areas may have been greater than required because the licensee overestimated the area of the RRZ adjacent to the Tachie River. I therefore accept the information on riparian management areas as the best available and adequate for this determination.

I note that regardless of the assumptions made in the analysis, the licensee will still be required to meet the standards of the Forest Practices Code. Notwithstanding this requirement, I expect the licensee to refine the riparian classification and methodology before the next determination.

- deer winter range

TFL 42 is situated at the northern extent of mule deer winter range. Mule deer survival during winter is typically dependent on old growth or mature Douglas-fir stands with well developed canopies that intercept snow, provide security and thermal cover, and provide food through litterfall.

In the timber supply analysis, the licensee identified a 'Douglas-fir/mule deer' management zone representing 3919 hectares (approximately 12 percent) of the timber harvesting land base. The zone consists of all Douglas-fir-leading stands on TFL 42 including those along the north arm of Stuart Lake. According to the licensee the purpose of this zone is to recognize the importance of promoting regenerating Douglas-fir stands as well as to acknowledge the potential for mule deer on TFL 42. However, licensee staff contend that there has never been a mule deer sighted in the area.

In the analysis, Tanizul assumed that at any given time, no more than 25 percent of the zone is permitted to support stands less than two metres tall. The specific objectives of this forest cover constraint were not identified by the licensee in its analysis and are not supported by BCFS staff or MELP specialists. MELP staff suggest that a more appropriate forest cover requirement that maintains mule deer winter range habitat would be to require a minimum of 32 percent of the area be retained in stands older than 120 years, and at least 52 percent of the area be retained in stands older that 60 years. MELP staff also recommend that these requirements be applied to a more specific area along the north arm of Stuart Lake, not the 'Douglas-fir/mule deer' management zone assumed in the analysis.

I have reviewed the respective locations of the 'Douglas-fir/mule deer' zone and the more specific area identified by MELP as potentially suitable winter range. I note that there is significant overlap between the partial retention and retention VQO zones (discussed above under *visually sensitive areas*) and the area favoured by MELP as suitable for deer winter range. By virtue of the overlap and their more restrictive requirements, I find it likely that the constraints applied to the recommended VQO zones will broadly accommodate habitat requirements on most of the ungulate winter range area purported by MELP. In addition, I acknowledge that little harvesting is proposed over the next five years in these areas because the ongoing beetle infestation in pine- and spruce-leading stands is largely dictating the current pattern of harvesting.

I also note that there is currently a provincial framework for the establishment and confirmation under the Forest Practices Code of ungulate winter ranges, and that to date no winter ranges within TFL 42 have been finalized.

I acknowledge that the specific mule deer habitat requirements on TFL 42 are uncertain at this time. However, based on the above considerations, I see no significant risk to mule deer as a result of this AAC determination during the next five year period.

Nonetheless, I request that the licensee work with the Ministry of Water, Land and Air Protection (MWLAP) and the BCFS to clarify the habitat needs of mule deer within TFL 42 and determine if winter ranges that meet the definition in the *Operational Planning Regulation* exist in the area. Any new information will be incorporated into the next analysis.

- identified wildlife

'Identified wildlife' refers to species 'at risk' (red- and blue-listed) and to regionally significant species which may be impacted by forest management activities, and which may not be adequately protected by existing management strategies such as those for biodiversity, riparian management, ungulate winter range or through the application of

other forest cover constraints. Species at risk as defined under the Forest Practices Code also include those species that are not considered at risk provincially but which have regional populations that may be threatened. The intent is to address the habitat needs of regionally significant wildlife early on, in order to lessen the chance that they will become listed as threatened or endangered provincially.

The Identified Wildlife Management Strategy (IWMS) was released in February 1999 and Volume I establishes a list of species which occur or potentially occur within the Fort St. James forest district. For the Babine Upland Ecosection which covers TFL 42, the list currently includes bull trout, American bittern, trumpeter swan, northern goshawk *ssp atricapillus*, Sandhill crane, fisher, and grizzly bear. Volume II, which has yet to be released, may identify additional species. According to district and regional MELP staff, currently the only species of potential concern is the northern goshawk.

In general, identified wildlife species will be managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans. Specific WHAs or management strategies for identified wildlife species have not yet been established on TFL 42. As a result, no specific exclusions were applied in the base case.

Government has limited the impact of management for identified wildlife to a maximum of one percent of the short-term harvest level for the province. When WHAs are identified or established, and GWMs are implemented, the impacts on timber supply of management for identified wildlife will be more quantifiable. In addition, measures will be assessed over time to determine if those measures are sufficient to adequately protect the identified wildlife species. The identified wildlife strategy and associated timber supply impact thresholds may be changed after such an evaluation, but I cannot speculate on the outcome of this process. In addition, I cannot speculate about decisions that may be made during future land and resource management planning processes with respect to identified wildlife. Any future changes to the required measures for identified wildlife species which result in impacts to timber supply, either under the IWMS or according to approved plans, will be incorporated into future determinations.

For this determination, it is not possible to specify the exact location or precise amount of habitat area that will be required within the timber harvesting land base to implement the IWMS. I expect that many of the habitat requirements of identified wildlife species are already accounted for through other forest cover requirements applied in the analysis. I note that MELP staff suggest that of the species listed, only the management requirements for northern goshawk are likely to result in additional timber supply impacts on the TFL. Inventory data for this species are limited at this time.

Given the commitment made by government discussed above, it has been appropriate in the majority of AAC determinations to account for an expected but not fully quantified impact on the timber supply. In consideration of the information regarding identified wildlife, and relative to the base case projection, I consider it appropriate to expect a reduction to timber supply of up to a maximum of 1 percent in the mid to long term as a result of the implementation of the IWMS. I will discuss this further under 'Reasons for decision'.

- green-up and adjacency

To manage for resources such as water quality, wildlife and aesthetics, and to avoid concentrating harvesting-related disturbance in particular areas, operational practices limit the size and shape of cutblocks, the maximum disturbance, and prescribed minimum green-up heights required for regeneration on harvested areas before adjacent areas may be harvested. Green-up requirements ensure maintenance of water quality, wildlife habitat, soil stability and aesthetics. Adjacency, green-up and forest cover objectives guide harvesting practices to provide for a distribution of harvested areas and retained forest cover in a variety of age classes across the landscape.

In the timber supply analysis, Tanizul applied a spatially-implicit forest cover requirement to represent adjacency in the 19 213 hectare IRM zone that covers approximately 62 percent of the timber harvesting land base. The licensee assumed that at any given time, no more than 33 percent of the zone was permitted to support stands less than a minimum green-up height. In the analysis, Tanizul assumed a two-metre green-up height instead of the standard three metres described in the Forest Practices Code *Operational Planning Regulation*. Additional minimum forest cover constraints were also applied to a 3919 hectare Douglas-fir/deer zone and to 8109 hectares of visually sensitive areas as described above under *visually sensitive areas* and *wildlife*.

Sensitivity analysis provided by the licensee showed that short- and mid-term timber supply on TFL 42 are sensitive to changes in green-up height. Reducing green-up height by two metres—effectively removing the adjacency requirements in the IRM and the Douglas-fir/deer zones—increased mid-term timber supply by up to 20 percent compared to the base case. By contrast, a two-metre increase in green-up height immediately reduced short-term timber supply by over 10 percent.

I have reviewed the licensee's green-up and adjacency assumptions and have reasoned as follows: The licensee applied a two-metre green-up height in the base case instead of the standard three metres specified in the *Operational Planning Regulation*. District staff confirm that based on typical forest operations within the Fort St. James forest district, a three metre green-up height would have been more appropriate.

Taking guidance from the licensee's sensitivity analysis, I conclude that increasing the green-up height in the IRM zone to three metres is likely to restrict short-term timber supply, but I am uncertain of the precise impact since it was not specifically modelled.

However, I note that because of the severe bark beetle infestation on the TFL and the urgency associated with salvage operations, relaxation of standard adjacency requirements has and will continue to be required. The *Operational Planning Regulation* gives authority to the Fort St. James district manager to reduce green-up heights to adequately manage and conserve forest resources, including those resources at risk from bark beetles. In addition, the *Timber Harvesting Practices Regulation* includes provisions for relaxing green-up requirements where urgent salvage operations are necessary, as is the case for TFL 42.

Therefore, given the current beetle infestation, and the continued likelihood of salvage operations and harvesting activities aimed at containing spread of the beetle epidemic,

I expect that green-up limitations will continue to be relaxed in the short-term, because of the need to deal with the bark beetle infestation.

I note that current practice may require removing adjacency restrictions altogether in the short-term, and accelerating harvest in the IRM zone may lead to regeneration of larger areas of unfragmented forest than was projected in the analysis. Although not specifically examined in the timber supply analysis, this could potentially lead to greater management flexibility upon maturity of these large areas of contiguous forest. Given the relatively small size and the current age class structure of the TFL, I strongly encourage the licensee to examine this issue in detail at the time of the next determination. In any case, I accept the modelling of green-up requirements for the purposes of this determination and make no adjustments to the base case on account of this factor.

- stand-level biodiversity

Biodiversity is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at both the stand and landscape levels.

Stand-level biodiversity management includes retaining wildlife tree patches (WTPs), within or adjacent to cutblocks to provide structural diversity and wildlife habitat. The *Biodiversity Guidebook* makes recommendations for percentages of area to be retained in WTPs, based on specific assumptions about the land base. *The Landscape Unit Planning Guide* reflects the principles described in the *Biodiversity Guidebook*, and describes the policy on the implementation of biodiversity management.

In the timber supply analysis, the licensee used table A3.1 in the *Landscape Unit Planning Guide* to determine the applicable retention rates for WTPs. Riparian reserves and productive areas excluded from the timber harvesting land base for other reasons also contribute to stand level biodiversity requirements. The licensee calculated the amount of additional area necessary to meet the requirement, and excluded an additional 1345 hectares from the timber harvesting land base in the analysis to account for wildlife tree retention.

BCFS district and MELP staff support the assumptions and approach used in the analysis. The licensee also provided a sensitivity analysis that showed that the retention of wildlife trees decreases long-term timber supply by about three percent compared to the base case harvest forecast.

Having reviewed the assumptions used in the base case and discussed them with BCFS staff, I have concluded that the accounting for wildlife tree patches is appropriate and consistent with the provisions of the *Landscape Unit Planning Guide*. I therefore accept it as the best available information and suitable for this determination.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. A major consideration in managing for

biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species that are dependent on or are strongly associated with old-growth forests. Although some general forest management practices can broadly accommodate the needs of most ecosystems, more often a variety of practices is needed to represent the different natural disturbance patterns under which ecosystems have evolved.

The delineation and formal designation of 'landscape units' is a key component of a sub-regional biodiversity management strategy. A landscape unit is an area established by the district manager, generally up to 100 000 hectares in size, based on topographic or geographic features such as a watershed, or series of watersheds, to manage biodiversity and other forest resource values.

TFL 42 falls within all or a portion of three landscape units. For the timber supply analysis, the landscape-level biodiversity requirements were assumed to be met solely within the boundaries of the TFL.

The *Biodiversity Guidebook*, the *Landscape Unit Planning Guide* and *Higher Level Plans: Policy and Procedures* all provide policy and guidance on management for landscape-level biodiversity. The *Landscape Unit Planning Guide* provides guidance on which components of the full range of recommendations included in the *Biodiversity Guidebook* should be implemented to achieve a balance of forest management objectives. The *Landscape Unit Planning Guide* contains forest cover requirements for old seral forest that are to be applied at the biogeoclimatic variant level within each landscape unit. The requirements are stated as a minimum percentage of the productive forest to be retained in stands above a specified age that varies by ecosystem type. The guide also allows the old-seral requirement to be phased in over time in landscape units with a lower biodiversity emphasis.

The 1996 Higher Level Plans: Policy and Procedures guide provides further policy guidance. It outlines three biodiversity emphasis options (BEOs)—lower, intermediate and higher—that may be employed when establishing biodiversity management objectives for a landscape unit. To achieve a balance between biodiversity and timber supply objectives, this guide recommends the application of a mix of BEOs in each subregional planning area. The proportions of a planning area subject to lower and intermediate biodiversity emphasis should range from 30 to 55 percent, with the average at approximately 45 percent of the area subject to lower, 45 percent to intermediate, and 10 percent to a higher BEO.

In the analysis, the licensee determined the 'mature plus old' and 'old' seral stage requirements for each biogeoclimatic variant/landscape unit combination based on table A3.1 of the *Landscape Unit Planning Guide*. In view of the draft status of the BEOs, the licensee applied a 45-45-10 weighted-average biodiversity emphasis in the base case. Although the guide allows the old-seral requirement to be phased in over time in landscape units with a lower BEO, the licensee applied the full requirement immediately in the base case harvest projection.

Various sensitivity analyses provided by the licensee illustrated that reducing the old seral requirements by one-third and phasing in the full requirement over three rotations does not impact short-term timber supply on TFL 42.

Having reviewed the assumptions applied in the base and in the associated sensitivity analyses, I conclude that short-term timber supply is not constrained by the old seral requirements. However, I note that older stands on TFL 42 are typically the most susceptible to bark beetle damage and depending on the rate of expansion of the infestation and the duration of the epidemic, the proportion of older stands may be significantly reduced. While I accept the information as modelled for this determination, I note that the base case projection is somewhat uncertain in this regard. I recommend this issue be re-examined in detail in the next timber supply analysis to ensure that any future risks to biodiversity on this unit are minimized.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

Other information

- 20-year plan

The main purpose of the 20-year plan is to show if the harvest volume projected in the base case can be spatially configured in specific areas on the landscape over the next 20 years.

Sterling Wood Group Inc. used its proprietary spatial harvesting model 'Patterns for Resource Integration and Spatial Management' (PRISM) to develop the 20-year plan on behalf of the licensee. The 20-year plan incorporates blocks from the forest development plan; additional blocks for the remainder of the period were generated based on the same management assumptions, including those for green-up, that were modelled in the base case.

Because of the seriousness of the bark beetle infestation, the licensee did not generate a 20-year plan based on the base case harvest projection. Instead, Tanizul provided two different scenarios in the 20-year plan. The licensee's 'best case' scenario was intended to simulate a possible harvest configuration based on salvage of existing beetle infested stands. The licensee's 'worst case' forecast was intended to reflect a potential harvest pattern assuming continued expansion of the beetle infestation. The target volumes in each forecast were consistent with the corresponding TREEFARM generated harvest projections described later under *timber supply analysis alternative projections*.

The district manager conditionally accepted the licensee's 20-year plan on July 9, 2001 and noted that the licensee was unable to meet the target volumes without removing green-up requirements. In addition, the district manager noted that, consistent with the base case, the 20-year plan indicates that increasing the short-term harvest levels will significantly reduce timber supply in the mid term. She also stressed the limited harvesting flexibility in the unit and emphasized the importance of targeting only beetle-infested stands during the next five year period.

I recognize that it may be difficult for the licensee to configure the proposed harvest level on the landscape without contravening standard adjacency requirements. I am also mindful that the 20-year plan is not an operational plan and acknowledge that it provides just one alternative distribution of the proposed harvest over time. While the 20-year plan indicates limited harvesting flexibility, I am aware that the *Operational Planning*

Regulation gives authority to the Fort St. James district manager to reduce green-up heights to adequately manage and conserve forest resources including those resources at risk from bark beetles. In addition, the *Timber Harvesting Practices Regulation* includes provisions for relaxing green-up requirements to recover timber damaged by insects.

I have considered the 20-year plan and its implications to timber supply in my determination.

- Fort St. James Land and Resource Management Plan

The *Fort St. James Land and Resource Management Plan* (LRMP) covers over three million hectares of north-central British Columbia including the majority of TFL 42. The LRMP is intended to guide ongoing resource management activities including designation of new provincial parks and planning for forest development. The LRMP provides integrated resource management direction for crown lands within the boundaries of the Fort St. James forest district. The plan is intended to give certainty to resource interests and provides guidance on the management of environmental and social values including wildlife habitat, fisheries and recreation.

The plan—approved by Cabinet in March 1999—divides the LRMP land base into 36 resource management zones, which fall into the following five categories: settlement/agriculture, resource development, multi-value, special management, and protected areas. TFL 42 consists of the Tanizul resource management zone as well as a portion of the larger Stuart-Trembleur management zone.

Within the LRMP, management direction is presented in the form of intent, objectives, and strategies. Overall management direction for each of the resource management zones consists of General Management Direction as well as site specific objectives and strategies.

Implementation of the Fort St. James LRMP is ongoing and the responsibility of the Omineca-Peace Interagency Management Committee. I note Tanizul's commitment to the goals of the LRMP and the objectives and strategies for each resource management zone. Having discussed the LRMP with BCFS district staff I am satisfied that the broad provisions of the plan are reflected in current management of the TFL, which in turn was adequately reflected in the analysis.

Overall in making my determination, I have been mindful of the land use planning decisions affecting TFL 42 and acknowledge that future determinations will reflect ongoing implementation and clarification of the LRMP.

(b) the short and long-term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardizing future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue

to be determined to ensure that current and mid-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

For TFL 42, I have considered two alternative timber supply forecasts—the licensee's 'best case' and 'worst case' projections. In view of the important relationships between these two timber supply forecasts and the current and projected bark beetle infestation, I have included specific details within a later section entitled Epidemic bark beetle infestation.

Community dependence on the forest industry

Forest-based employment is a significant component of the local economy of Fort St. James and the surrounding area. According to Tanizul, there are currently two people employed in the licensee's woodlands division with a further 30 worker years of employment in harvesting, silviculture, and consulting activities. Most of the employees and contractors employed by Tanizul reside in Tachie and Fort St. James.

I have reviewed the information regarding community dependence on the forest industry and conclude that the timber harvested on TFL 42 contributes significantly to employment objectives of the Tl'az'ten Nation and the region as a whole.

Difference between AAC and actual harvest

Holders of replaceable licences such as TFL 42 have some flexibility in the administration of their AAC, referred to under the *Forest Act* as the cut control period. The volume of timber harvested during a calendar year must be within 50 percent of the AAC in each year (annual cut control), and within 10 percent of the total of the AACs authorized for the five-year period (periodic cut control).

I note that the licensee met its cut control requirements on TFL 42 over the previous cut control period, and is expected to meet the requirements during the current five-year period. Tanizul's performance to date and its latest forest development plan suggest the company has the ability to continue meeting its cut control obligations on the TFL.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

The Tl'azt'en Nation owns the Teeslee Forest Products sawmill located at Tachie. Although the mill has the capacity to process approximately 15-20 percent of the TFL harvest, the facility has not operated since January 1998.

As a result, TFL harvest is currently purchased and processed at the Canadian Forest Products mill in Fort St. James sawmill except for Douglas-fir logs, which are processed where marketed. In addition, pulp logs go directly to Pinewood Holdings in Fort St.

James for processing into either chips or lumber where feasible. I note the licensee also has a log export permit for up to 15 000 cubic metres which expires in December 2001.

I note that the timber supply from TFL 42 contributes significantly to local mill requirements and to employment in the region and have considered this in my determination.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia;

Economic and social objectives

- Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). These economic and social objectives are an important consideration in my determination of an AAC for TFL 42.

This letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that 'any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.' He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for TFL 42. As discussed earlier under *commercial thinning*, I concluded that the opportunities for commercial thinning are currently very limited on the TFL. In addition, as discussed earlier under *economic and physical operability*, I am satisfied that there are no further significant opportunities at this time for harvesting in previously uneconomical areas. As noted under *deciduous stands*, it is possible that in the future, the merchantability of deciduous species may improve. However, at this time I have no evidence that suggests this will occur during the next five-year period nor do I see any advantage of partitioning the AAC at this time.

The Minister's memorandum addressed the effects of visual resource management on timber supply. In it, the Minister asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. As discussed under, *visually sensitive areas*, the licensee's analysis demonstrated that relaxation of existing visual quality requirements has minimal impact timber supply.

Public involvement

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives.

The licensee provided opportunities for public review of draft Management Plan No. 4 at an open house by advertising in local and regional newspapers and making the documents available for public viewing. I note the regional manager approved Tanizul's request for a shortened 30-day review period. According to the licensee, no verbal or written comments affecting timber supply were received as a result of the review and I am unaware of any specific issue that would impact this determination.

Having reviewed and discussed the public involvement process with Fort St. James forest district staff, I am satisfied that the licensee took adequate measures to encourage and collect public input.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Epidemic bark beetle infestation

- description of the beetles

Bark beetles are members of the family Scolytidae and belong to the order of insects known as Coleoptra. When bark beetles occur at low (endemic) levels within stands, they typically infest branches, stumps, and stems of standing dead or severely weakened trees or trees that are wind-thrown. These insects inhabit forests throughout British Columbia and like forest fires, play an integral role in the natural life cycle of a forest. However, a relatively few species can attack and kill living, apparently healthy trees, and periodically reach very high (epidemic) levels causing widespread damage to forest stands.

The major damaging bark beetles on TFL 42 currently are the spruce beetle (*Dendroctonus rufipennis* (Kirby)), mountain pine beetle (*Dendroctonus ponderosae* Hopk.), and Douglas-fir beetle (*Dendroctonus pseudotsugae* Hopk.). All three species have a similar appearance and life cycle and typically attack large diameter, mature and old-growth trees.

The cylindrically-shaped adults bore through the bark of host trees and the beetle larvae feed on the live phloem (the layer between the bark and wood of a tree). The action of the larval feeding together with fungal colonization of the sapwood interrupt the flow of nutrients and water in the tree stem and eventually kill the tree.

Hot dry summers, mild winters and an abundant food source allow bark beetle populations to quickly reach epidemic levels in mature forests. When this occurs, natural predators like woodpeckers cannot reproduce quickly enough to maintain the insect population at manageable levels. Large tracts of younger, apparently healthy trees can also be killed under these conditions. Spruce beetle larvae are able to mature and emerge as adults in a single season under optimal conditions.

For the past several years, mild winter weather patterns have significantly influenced the expansion of the beetle population. Warm, daily mean temperatures in the summer have allowed beetles to emerge over a very short period.

- beetle management strategies

A number of control methods may be effective for endemic levels of beetles. General management strategies are described in the *Bark Beetle Management Guidebook*. The guidebook describes detection methods, treatment selection and application aimed at reducing tree mortality caused by bark beetle outbreaks. The document also provides a framework for evaluating damage to timber, the impact on other resources, treatment effectiveness and monitoring.

The *Fort St. James Forest District Bark Beetle Strategic Plan* provides more specific guidance to forest managers with respect to bark beetle management in the Fort St. James forest district including the area of TFL 42. The objectives of the strategic plan are to minimize timber losses and protect all forest resources. The plan identifies 34 Forest Health Management Units (FHMUs) and six broad beetle management strategies—Prevention, Suppression, Maintain low, Holding action, Salvage, and Abandon. Selection of an appropriate management strategy is based on the extent and distribution of beetle infestations in the area and the expected impact on adjacent timber and other forest resources. Specific tactics for managing beetles include field surveys and mapping, sanitation and salvage harvesting, single tree treatments, baiting, hauling restrictions, and access development.

To meet the specific objectives of the strategic plan, the Fort St. James district manager has provided operational guidance for bark beetle management, consistent with the strategy. Bark beetle susceptibility mapping together, with the district's *Forest Health Priority Rating System* are used to track population trends, identify areas with the highest risk of attack, and recommend target treatment levels.

The licensee is responsible for preparing a yearly action plan following the aerial survey that lists actions for all the polygons of infested timber found in the TFL. Current operational strategies include directing harvesting to infested areas. This is achieved primarily through clearcutting as well as some group and single-tree selection and the falling and burning of infested trees. Probing and walkthroughs are completed on areas of infestation to determine the priority stands that require harvest.

I also note that the Premier of British Columbia has recently established a government caucus task force to help guide the minister of forests in developing a provincial strategy to combat the mountain pine beetle. While the bark beetle infestation on TFL 42 consists of outbreaks of spruce beetles as well as mountain pine beetles, I expect the provincial strategy to be applicable to the area of TFL 42. Any new information arising from the task force will be reflected in operational plans and in the next AAC determination.

- extent of bark beetle infestation on TFL 42

As discussed previously under *age-class distribution and species profile* the licence area contains a high proportion of mature stands that are susceptible to attack by bark beetles.

In particular, a rapidly expanding and epidemic spruce beetle infestation is currently affecting spruce stands in the western half of the TFL.

Based on forest health survey data collected in the summer of 2000, BCFS staff estimate that there are currently over 2100 hectares infested with bark beetles on TFL 42. Almost 80 percent (1679 hectares) of these areas are infested with the spruce bark beetle. According to figures from the district's Forest Health Risk Priority Rating System, spruce beetle attack volumes in the TFL 42 Forest Health Management Unit increased over 170 000 percent between 1999 and 2000.

I have reviewed this information and note the large area of current infestation and rapid expansion of the spruce beetle infestation between 1999 and 2000. The current age class and species distribution of the TFL contribute to a high risk of further expansion of the infestation. Given current expansion rates, BCFS district staff estimate that by 2001, over 750 000 cubic metres will require salvage—well above the harvest level that can be accommodated within the current AAC over the next 5-years. I have considered this risk and further discussed the implications in my 'Reasons for decision'.

- timber supply analysis alternative projections

The licensee provided two sensitivity analyses to explore the potential implications of increasing the initial harvest level to manage the bark beetle infestation. Given their susceptibility to the spruce beetle, mature spruce-leading stands in particular were intentionally targeted to the harvest profile.

The licensee's 'worst case' scenario assumed that the infestation continues to spread unchecked over the next few years. In this scenario, the harvest projection in the first five years of the forecast was raised to 180 000 cubic metres per year, followed by a return to the present AAC for the subsequent five-year period. The average annual harvest level for the first decade was thus modelled at 150 000 cubic metres.

The 'best case' scenario assumed that the winter of 2001/2002 will produce conditions severe enough to kill the majority of beetle larvae. This scenario projects a harvest level of 150 000 cubic metres per year for five years, followed by a reduction to the current AAC of 120 000 cubic metres for the remainder of the first decade.

Having reviewed the information and discussed it with BCFS staff, I note there will be a significant 'falldown' in timber supply during decades two to five compared to the base case projection. If the initial harvest level is raised, mid-term timber supply is projected to be 15 to 20 percent lower than projected in the base case.

In conclusion, I have placed considerable weight on the impact of the current beetle infestation in my determination of the AAC for TFL 42. Accelerated harvesting can help to salvage infested stands and help to curtail the beetles' rate of spread into otherwise healthy forest. However, information from the licensee's timber supply analysis clearly indicates that increasing the harvest level in the short term will cause a significant decline in the mid-term harvest level. I have discussed this further in 'Reasons for Decision'.

Unsalvaged losses

Unsalvaged losses are those volumes expected to be lost on a regular basis to catastrophic natural forces. They do not include losses due to endemic infestations, which are normally accounted for within the growth and yield tables.

For the timber supply analysis, Tanizul applied assumptions used in the adjacent Prince George TSA to estimate unsalvaged losses. No information specific to the TFL was available. Using this approach, the licensee assumed annual unsalvaged losses of approximately 4400 cubic metres per year, attributed to fire (60 cubic metres), insects (4150 cubic metres), and wind (190 cubic metres).

I am mindful of the extreme uncertainty associated with estimating this factor, particularly in a small management unit such as TFL 42 with a history of significant bark beetle infestations. However, it is also important to note that the *Forest Act* refers to *unsalvaged* loss—after all salvage efforts have been made. Provided there are ongoing salvage initiatives and occasional increases in salvage and control strategies, I accept the estimates of loss as the best available information. Nonetheless, I request that the licensee closely monitor the effectiveness of beetle salvage activities and develop local estimates of unsalvaged losses in time for the next timber supply analysis.

Reasons for Decision

In reaching my AAC determination for TFL 42, I have considered all of the factors presented above, and I have reasoned as follows:

I have carefully examined and evaluated all the relevant considerations under Section 8, which are documented throughout this rationale and in view of the bark beetle epidemic, as I noted earlier, my decision turns largely on the considerations under section 8(8)(e) of the *Forest Act*. My evaluation of the other factors is necessary to ensure that important forest values are not unacceptably affected, and that all consequences of my determination are sufficiently informed by the full range of considerations. For this reason, while I have given primary weight to considerations under section 8(8)(e), I have also carefully examined other implications for timber supply.

For the reasons stated in 'Timber Supply Analysis' and from reviewing the considerations as recorded above, I accept the licensee's 'MoF Option' as an adequate basis from which to assess timber supply for this AAC determination. Under current management assumptions and practices, the timber supply analysis suggests that the current AAC of 120 000 cubic metres can be maintained for a maximum of two decades followed by successive declines of 10 percent per decade for three decades and further declines of 6 and 7 percent in decades six and eight.

The licensee provided a number of sensitivity analyses which showed that short- and mid-term timber supply is particularly sensitive to uncertainties in operability assumptions and green-up height. Even in the event of a 10 percent increase in the area of the timber harvesting land base, I noted a sustained decrease of 10 percent per decade is still projected beginning in the third decade.

Earlier in this document, I identified three factors that indicate that the timber supply projected in the base case may have been underestimated:

- *physical operability*: I considered the likelihood that the criteria used to define the operable area of TFL 42 effectively excluded significant areas of productive forest where timber harvesting activities will likely be feasible. In particular, I noted that approximately 1300 hectares of the Tan fire area should likely have been included in the derivation of the timber harvesting land base. Based on the licensee's sensitivity analysis, I concluded that mid- and long-term timber supplies were probably underestimated by about five and three percent respectively, compared to the base case projection.

- *site productivity estimates*: Based on provincial old growth site index (OGSI) studies as well as the results of sensitivity analyses for TFL 42, I concluded that long-term timber supply may be underestimated by up to 17 percent compared to the base case projection.

- *use of select seed*: I considered that the current use of select interior spruce seed on TFL 42 is likely to result in higher volume gains than were reflected in the base case. While this influences long-term timber supply (by no more than two percent), increased growth rates of regenerating stands influence the time taken to reach green-up and minimum harvestable age, and therefore may also increase mid-term timber supply.

Offsetting the above factors somewhat, I noted one factor as a reason why the timber supply projected in the base case may have been slightly overestimated.

- *identified wildlife*: There was no explicit accounting of the potential impacts of identified wildlife habitat in the base case projection. It is likely that at least one rare and endangered species (northern goshawk) occurs within the boundaries of TFL 42 and I concluded that its habitat requirements may not be adequately addressed in the base case. Current provincial policy on identified wildlife limits provincial impacts to one percent. Accordingly, and in the absence of information specific to TFL 42, I concluded that the corresponding impact to timber supply on the TFL is likely to be less than one percent over the forecast horizon.

The net implication of these mutually opposing factors is uncertain, but with the exception of identified wildlife, none is likely to influence short-term timber supply. In addition, because of their relatively small order of magnitude, the combined effect of these factors is unlikely to impact timber supply over the next five-year period. I am satisfied that the associated uncertainty can be resolved at the time of the next determination without significant risk to the short-term timber supply projected in the base case.

The overwhelming factor in this determination is the epidemic infestation of bark beetles. The high rate of expansion of bark beetle populations—particularly the spruce beetle—the associated damage to stands, and the large proportion of stands in the TFL susceptible to further attack cause me great concern.

It is my view that the potential for the current epidemic to compromise the achievement of a range of forest management objectives is directly related to the eventual damage the beetle populations are able to incur before their populations collapse. The conditions that would lead to this collapse include the availability of host material and highly uncertain weather events. For these reasons, containment of the infestation and the salvage of large and growing areas of damaged timber have become urgent and complementary forest management priorities for TFL 42.

I have been advised that the licensee has recently identified and proposed priority cut blocks totalling almost 800 000 cubic metres aimed at salvaging damaged timber and containing the infestation. The licensee has demonstrated in its proposed forest development plan that access to almost 160 000 cubic metres per year over the next five year period is feasible.

As discussed earlier under *extent of bark beetle infestation on TFL 42*, based on projected expansion rates, the estimated volume that is now infested is potentially more than 750 000 cubic metres. This figure accords reasonably well with the licensee's proposed development plan and is well above the harvest level that can be accommodated within the current AAC.

The determination of an appropriate increase in the harvest level—to remove affected timber, to eliminate brood trees , to capture otherwise lost value and to avoid extensive regeneration delays from residual unsalvaged areas—should also reflect a level that is operationally achievable.

I noted that Tanizul's harvesting performance to date and its latest forest development plan suggest that it can accommodate an AAC of 160 000 cubic metres within its operations over the next five years. If the bark beetle populations continue to expand, legislated cut control provisions allow for some flexibility to harvest above the AAC for brief periods, provided that the accumulated harvest is consistent with the AAC over time.

Determination

Having considered and reviewed all the factors documented above, including the risks and uncertainties of the information provided, it is my determination that a timber harvest that (i) accommodates objectives for all forest resources during the next five years, (ii) reflects current management practices as well as socio-economic objectives of the Crown, and (iii) provides for the timely salvage of timber damaged by bark beetles while (iv) diminishing the overall extent of future damage by bark beetles, can best be achieved at this time by establishing an AAC of 160 000 cubic metres.

This AAC is effective August 1, 2001 and will remain in effect until a new AAC is determined which must take place within five years of the date of this determination. As part of this AAC determination, I am requesting that the licensee concentrate harvesting in cut blocks attacked or at high risk of beetle attack in order to minimize timber losses and maximize containment of the bark beetle populations.

I recognize that this pace of harvesting cannot be maintained without a significant decline in mid-term timber supply. Therefore, if it becomes evident during the next five years that the beetle population has collapsed and that there is no need to harvest at this level for the sake of avoiding timber losses, I will consider adjusting the AAC downwards.

Implementation

In the period following this decision and leading to the next AAC determination, I request that the licensee:

- in order to minimize the impacts on future timber supply, give the highest priority to harvesting stands which are beetle infested or at risk of becoming beetle infested;
- work closely with BCFS staff to carefully monitor and apprise me of the condition of the bark beetle infestation, on the understanding that if and when the need for accelerated harvesting has abated, this determination may be revisited at a date earlier than required by statute;
- thoroughly review and field verify its operability criteria in time for the next determination;
- provide a comprehensive accounting of all NSR areas on TFL 42 and ensure that the management objectives for these areas are clarified in time for the next determination;
- included a visual landscape inventory of Tanizul and McKelvey Lakes as part of its commitment to update the visual landscape inventory;
- work with the new MWLAP and BCFS staff to clarify the habitat needs of mule deer within the TFL, and determine if winter ranges that meet the definition in the *Operational Planning Regulation* exist in the area.

Ken Baker

Ken Baker
Deputy Chief Forester
August 1, 2001

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silviculture treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

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Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: **The Crown's Economic And Social Objectives Regarding Visual Resources**

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

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In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests